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KeyTek

EFT/NOISE GENERATOR

MODEL 801-4/801-4H

OPERATING INSTRUCTIONS

Keytek Instrument Corp.

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Wilmington, MA 01887

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KeyTek® Model 801-4/801-4H OPERATION

GENERAL

The KeyTek Model 801-4 EFT/Noise™ Generator is designed to perform fast transient burst testing of electronic instrumentation in accordance with IEC international standard 801-4. Other equipment in this family of instruments extend the test range beyond the testing requirements of IEC 801-4. The Model 801-4/801-4H includes an internal coupling/decoupling network in order to permit EUT (equipment under test) operation up to 16A or 32A average current from single or three phase power, depending on the specific equipment model. Overcurrent protection is provided for the EUT in the even of test-induced breakdown.

SAFETY

THIS EQUIPMENT GENERATES HIGH VOLTAGES AND SHOULD BE USED BY TRAINED PERSONNEL ONLY. ALWAYS WEAR SAFETY GOGGLES WHEN USING THIS EQUIPMENT. DO NOT DEFEAT INTERLOCK OPERATION. ALL EUT CONNECTIONS AND THE EUT SHOULD BE ISOLATED FOR AT LEAST 2X THE EXPECTED TEST VOLTAGE. NO USER SERVICEABLE PARTS ARE INSIDE THIS EQUIPMENT. REFER SERVICING TO AN AUTHORIZED KEYTEK REPRESENTATIVE. NOTE THAT THIS EQUIPMENT IN THE COURSE OF NORMAL OPERATION PRESENTS DANGER OF LETHAL ELECTRICAL SHOCK IF INTERLOCK CIRCUITRY IS DEFEATED.

EMI

NOTE THAT THIS EQUIPMENT IS DESIGNED TO GENERATE HIGH VOLTAGE NOISE BURSTS WHICH MAY INTERFERE WITH NEARBY ELECTRONIC EQUIPMENT SUCH AS COMPUTERS, RADIO AND TELEVISION RECEIVERS, AND MEDICAL EQUIPMENT INCLUDING PACEMAKERS AND OTHER ELECTRONIC PROSTHETIC EQUIPMENT.

REFERENCE MATERIAL

The user of this equipment is referred to IEC international standard 801-4. Please refer to this document and the reproduction of the front panel of the KeyTek EFT/Noise Generator.

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KeyTek Model 801-4 Operation

DESCRIPTION

The 801-4 consists of two basic sections:

1.) The transient generator portion of the Model 801-4 consists of a hydrogen thyratron-switched discharge circuit, inverting transformer, and high voltage relays which permit polarity and range selection of the output. Auxiliary circuitry provides housekeeping power for the thyratron heater and trigger supplies, the time base generator necessary to provide pulse rate, duration, and period information, and the high voltage power supply used to create the necessary wave trains.

2.) The EUT coupler/decoupler network accepts power via a twist-lock connector at the center of the cabinet rear panel. This power is controlled by means of an industrial grade contactor which receives connect/disconnect information from a front panel pushbutton and the interlock chain. Overcurrent protection is provided by a thermal overload protector connected to the contactor. Decoupler chokes permit fast transient testing of EUT power connections as selected by front panel buttons. Coupling capacitors couple the transient generator output to the power line connections to the EUT. The specific circuit configuration, less the contactor described above, is shown in figure 4, page 27, of the Standard. Note that the circuit shown there is three phase power: single phase models have only one phase connection along with neutral and PE (protective earth).

Front Panel Controls:

Refer to the illustration of the equipment front panel.

The POWER rocker switch supplies power to the transient generator portion of the equipment. Since this section also powers the contactor in the EUT section, the switch functions as main power control.

The READY/STANDBY lights indicate operation status. At turn-on, a three minute STANDBY time delay allows a proper warmup period for the hydrogen thyratron. Burst Output and Burst High Voltage are disabled during the STANDBY timeout.

The REDUCE VOLTS OR RATE light indicates an attempt to operate the equipment outside of the 801-4 voltage/pulse-rate operating range.

The OPEN INTERLOCKS lights are self explanatory. An open interlock inhibits burst output and EUT power.

The POLARITY switch selects the polarity of the output pulse train.

The RANGE switch is used to select the operating range of the high voltage section. The digital panel meter range is simultaneously switched as appropriate.

The PULSE RATE switch allows pulse frequency selection as marked on the panel, or operation in the "chirp" mode, where the operating frequency is swept over a one octave range during each burst.

The BURST DURATION control allows operator control of the length of the pulse train over a range of 1-20ms. At the full CW detented position the specification value of 15ms is provided.

The BURST PERIOD control permits continuous operator adjustment of the repetition rate of the pulse burst over the range of one burst/5 seconds to one burst/.3 seconds.

The BURST HIGH VOLTAGE ON light indicates that the system is ready to perform HV testing at a voltage set by the SET VOLTAGE multiturn control.

The HAZARDOUS VOLTAGE AT OUTPUTS light indicates that the EUT contactor is closed and EUT power connected to the rear receptacle is present at the EUT panel.

The BURST ACTIVATE pushbuttons permit operator selection of the time base mode. In the MOM position, one burst is transmitted for each actuation of the button.

The EUT BURST COUPLING pushbuttons allow selection of the EUT line to be surged.

The EUT POWER pushbutton connects and disconnects EUT power from the front panel receptacle on alternate strokes. The pushbutton is illuminated when the EUT connection is complete.

The BURST V MON connector permits operator viewing of a waveshape proportional to the generated pulse. The sensitivity displayed on the panel is ONLY correct when the interconnecting cable is terminated in 50 ohms at the oscilloscope. The signal is intended to indicate polarity and approximate waveshape only, and hence should not be expected to be a true replica of the Noise Generator output. It will be noted that the first pulse of a burst delivered in the MOM position will be less than the amplitude of succeeding pulses - this is due to internal circuitry required to recharge the high voltage pulse capacitor.

The output covers are utilized as follows to enable coupler/ decoupler connection to the EUT. In all cases the Ground Bracket is to be securely installed to the EUT panel and used as a ground return.

To test a line powered EUT, connect the EUT to the output receptacle installed on the front panel. Install the C2 output cover. Select the line to be surged using the EUT BURST COUPLING pushbuttons. Set the operating conditions using the front panel controls and use the BURST ACTIVATE pushbuttons to energize the time base generator.

To test an interconnecting cable using the CCL-801 Capacitive Coupling Clamp, install the B3 Burst Output Cable and Cover on the EUT panel. Connect the coaxial and telephone type connectors to the CCL-801. Insert the cable to be tested beneath the hinged cover of the clamp, tighten the clamp screws, and put the safety shield in place. Set the Model 801-4 for the desired voltage, pulse rate, burst duration, and burst period. Initiate the test cycle with the appropriate BURST ACTIVATE button.

The coaxial output connectors employed are type HN, selected for high voltage holdoff capability. DO NOT connect this output directly to a cathode ray oscilloscope. The recommended attenuator is a Barth model 2236 HFNFP followed by TEK 5X and 10X BNC attenuators and terminated by 50 ohms. This gives an overall attenuation of 2000:1, an appropriate value for the input voltage range of most oscilloscopes.

EFT/ Noise™ GENERATOR

BURSTS OF 5 ns / 50 ns PULSES

INTERNAL COUPLER / DECOUPLER

WARNING!

INSULATE ALL OUTPUT WIRES / CABLES AND EUT FOR 2 x PEAK VOLTAGE
EUT GROUND IS PROTECTIVE EARTH (PE) AND CARRIES EFT BURST
DO NOT DISABLE ANY INTERLOCK

EUT POWER

PEAK OPEN CIRCUIT KILOVOLTS

POLARITY — +

OPEN INTERLOCK

OUTPUT COVER — THERMAL

MAINS GND — EXTERNAL

RANGE

<1kV — MAX

BURST HIGH VOLTAGE ON

HAZARDOUS VOLTAGE AT OUTPUT

EXTERNAL INTERLOCK

BURST V MON
1000 V / V

1-5

SET VOLTAGE

PULSE RATE

Chirp — RATE kHZ

REDUCE VOLTS OR RATE

1
2.5
5*
10*

BURST DURATION
ms

1 — 15 CAL — 20

BURST PERIOD
sec

5 — 0.3 CAL — 0.3

* MODEL 801-4H 4.4kV MAX

LOCAL

REMOTE

WARMUP

POWER

READY

STANDBY

RESTORE READY

BURST ACTIVATE

REPETITIVE

MOM — ON — OFF

SINGLE AND MULTI-LINE EUT BURST COUPLING

SELECT ONE

GND (PE) — N — L1

CHASSIS

KeyTek® INSTRUMENT CORP

USE CHASSIS GROUNDING BRACKET CGB-2
TO CONNECT GENERATOR TO EXTERNAL
GROUND REFERENCE PLANE (GRP)

EFT/ Noise™ GENERATOR

BURSTS OF 5 ns / 50 ns PULSES

3 – PHASE INTERNAL COUPLER / DECOUPLER

AC MAINS VOLTAGE

LINE 3

LINE 2

LINE 1

NEUTRAL

WARNING!

INSULATE ALL OUTPUT WIRES / CABLES AND EUT FOR 2 x PEAK VOLTAGE
EUT GROUND IS PROTECTIVE EARTH (PE) AND CARRIES EFT BURST
DO NOT DISABLE ANY INTERLOCK

EUT POWER

PEAK OPEN CIRCUIT KILOVOLTS

POLARITY — +

RANGE <1 kV MAX

OPEN INTERLOCK

OUTPUT COVER THERMAL

MAINS GND EXTERNAL

BURST HIGH VOLTAGE ON

HAZARDOUS VOLTAGE AT OUTPUT

EXTERNAL INTERLOCK

BURST V MON 1000 V / V

9-1

SET VOLTAGE

PULSE RATE

Chirp

RATE kHZ

1

2.5

5*

10*

REDUCE VOLTS OR RATE

BURST DURATION ms

1 15 CAL 20

BURST PERIOD sec

5 0.3 CAL 0.3

* MODEL 801-4H 4.4 kV MAX

LOCAL

REMOTE

WARMUP

POWER

READY

STANDBY

RESTORE READY

BURST ACTIVATE

REPETITIVE

MOM ON OFF

SINGLE AND MULTI-LINE EUT BURST COUPLING

SELECT ONE

GND (PE) N L1 L2 L3 CHASSIS

KeyTek® INSTRUMENT CORP

USE CHASSIS GROUNDING BRACKET CGB-2
TO CONNECT GENERATOR TO EXTERNAL
GROUND REFERENCE PLANE (GRP)

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